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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,049	10/14/2003	Xudong Fan	58391US002	5689

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EXAMINER	
MOONEY, MICHAEL P	

ART UNIT	PAPER NUMBER
2883	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com
LegalDocketing@mmm.com

Office Action Summary	Application No.	Applicant(s)	
	10/685,049	FAN ET AL.	
	Examiner	Art Unit	
	Michael P. Mooney	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :2/12/04, 9/2/04, 2/24/05, 2/28/05,8/22/05, 9/6/05, 11/10/05, 5/30/06, 7/13/06, 9/13/06, 10/27/06.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1- 13, 16-20, 23-27 are rejected under 35 U.S.C. 102b as being anticipated Vahala et al. (20020044739).

Vahala et al. teaches a microresonator device, comprising: a first substrate 502 having at least one self-aligning feature (e.g., 504, 506; fig. 20) on a surface; a first waveguide (e.g., figs. 1-3; fig. 20 @ element 200 and/or 600) disposed relative to the first substrate 502; and a microresonator 100 positioned on the substrate 502 by the self-aligning feature (e.g., 504) so as to optically couple to the first waveguide (600 and/or 200).

Thus claim 1 is met.

Vahala et al. teaches wherein the self-aligning feature 504 is a receiving cavity on the surface of the first substrate 502 (e.g., fig. 20). Thus claim 2 is met.

Vahala et al. teaches wherein the self-aligning feature 504 is a slot on the first substrate 502, wherein the microresonator 100 is positioned at a location along the slot (e.g., fig. 20). Thus claim 3 is met.

Vahala et al. teaches wherein the first waveguide (e.g., element 200 of fig. 20, figs. 1-3) is positioned in the slot 504 (e.g., fig. 20). Thus claim 4 is met.

Vahala et al. (fig. 20) teaches wherein the microresonator 100 (e.g., fig. 20) contacts a slot edge (i.e., the edge of slot 506 contacted by 100), the edge of slot 506 being nonparallel with the first waveguide (e.g., element 200 in fig. 20). Thus claim 5 is met.

Vahala et al. teaches wherein the microresonator 100 contacts the edge of slot 504, the edge of slot 504 being parallel with the first waveguide (e.g., fig. 20 element 200; see also figs. 1-3). Thus claim 6 is met.

Vahala et al. teaches wherein the slot 504 has a first edge (e.g., see the far left edge of element 504 in fig. 20) and a second edge (e.g., see the far right edge of element 504 in fig. 20) closer to the first waveguide 200 than the first edge (fig. 20), the microresonator 100 being aligned by the first edge of the slot and the first waveguide (inherent to the device of fig. 20). Thus claim 7 is met.

Vahala et al. teaches wherein the slot has a first edge and a second edge closer to the first waveguide (e.g., element 200) than the first edge, the microresonator being aligned by the first edge of the slot and the second edge of the slot (inherent to the device of fig. 20). Thus claim 8 is met.

Vahala et al. teaches wherein the slot has a first edge and a second edge closer to the first waveguide than the first edge, the microresonator being aligned by the first edge of the slot and the second edge of the slot (inherent to the device of fig. 20; see

also figs. 19, 21 as an aid to help understand this detail inherent to the device of fig. 20). Thus claim 9 is met.

Vahala et al. teaches wherein a direction of optical coupling between the first waveguide 600 and the microresonator 100 is parallel to the surface of the first substrate (inherent to the device of fig. 20). Thus claim 10 is met.

Vahala et al. teaches wherein a direction of optical coupling between the first waveguide and the microresonator is perpendicular to the surface of the first substrate (inherent to the device of fig. 20). Thus claim 11 is met.

Vahala et al. teaches wherein the first waveguide (e.g., 600) is an optical fiber (inherent to the device of fig. 20). Thus claim 12 is met.

Vahala et al. teaches wherein the optical fiber 600 is a tapered optical fiber (inherent to the device of fig. 20). Thus claim 13 is met.

Vahala et al. teaches wherein wherein the microresonator is microsphere (fig. 20; paragraphs 0090, 0153). Thus claim 16 is met.

Vahala et al. teaches further comprising an adhesive material disposed to hold the microresonator to the self-aligning feature (e.g., fig. 20; paragraph 0137). Thus claim 17 is met.

Vahala et al. teaches further comprising at least one retaining member disposed to retain the microresonator at a desired location relative to the self-aligning feature (e.g., fig. 20; paragraph 0137). Thus claim 18 is met.

Vahala et al. teaches further comprising a second substrate and a second waveguide disposed relative to the second substrate, the second waveguide being

optically coupled to the microresonator (e.g., fig. 19; paragraph 0145). Thus claim 19 is met.

Vahala et al. teaches further comprising a light source generating light, the light being coupled to the first waveguide and from the first waveguide to the microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 20 is met.

Vahala et al. teaches wherein the microresonator further comprises an optical gain medium (e.g., figs. 19-21; paragraph 0121). Thus claim 23 is met.

Vahala et al. teaches further comprising a second waveguide disposed relative to the first substrate, the second waveguide being optically coupled to the first microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 24 is met.

Vahala et al. teaches further comprising a second substrate disposed proximate the first substrate (e.g., figs. 19-21; paragraph 0150). Thus claim 25 is met.

Vahala et al. teaches further comprising a second waveguide disposed relative to one of the first and second substrates, the second waveguide being optically coupled to the first microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 26 is met.

Vahala et al. teaches wherein the first waveguide is attached to the first substrate and the second waveguide is attached to the second substrate (e.g., figs. 19-21; paragraph 0150). Thus claim 27 is met.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 14-15, 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vahala et al. (20020044739).

Vahala et al. teaches a microresonator device, comprising: a first substrate 502 having at least one self-aligning feature (e.g., 504, 506; fig. 20) on a surface; a first waveguide (e.g., figs. 1-3; fig. 20 @ element 200 and/or 600) disposed relative to the first substrate 502; and a microresonator 100 positioned on the substrate 502 by the self-aligning feature (e.g., 504) so as to optically couple to the first waveguide (600 and/or 200; fig. 20). Thus claim 1 is met.

Regarding claims 14-15, although Vahala et al. does not explicitly teach the first waveguide is a channel/planar waveguide, it would have been obvious to do so because it is conventionally known in the art to replace fiber waveguide devices with planar/channel waveguide devices and vice versa.

One of ordinary skill would have been motivated to replace a fiber waveguide device with a channel/planar waveguide for the purpose of manufacturing compatability.

Thus claims 14-15 are rejected.

Vahala et al. teaches wherein the self-aligning feature 504 is a receiving cavity on the surface of the first substrate 502 (e.g., fig. 20). Thus claim 2 is met.

Vahala et al. teaches wherein the self-aligning feature 504 is a slot on the first substrate 502, wherein the microresonator 100 is positioned at a location along the slot (e.g., fig. 20). Thus claim 3 is met.

Vahala et al. teaches wherein the first waveguide (e.g., element 200 of fig. 20, figs. 1-3) is positioned in the slot 504 (e.g., fig. 20). Thus claim 4 is met.

Vahala et al. (fig. 20) teaches wherein the microresonator 100 (e.g., fig. 20) contacts a slot edge (i.e., the edge of slot 506 contacted by 100), the edge of slot 506 being nonparallel with the first waveguide (e.g., element 200 in fig. 20). Thus claim 5 is met.

Vahala et al. teaches wherein the microresonator 100 contacts the edge of slot 504, the edge of slot 504 being parallel with the first waveguide (e.g., fig. 20 element 200; see also figs. 1-3). Thus claim 6 is met.

Vahala et al. teaches wherein the slot 504 has a first edge (e.g., see the far left edge of element 504 in fig. 20) and a second edge (e.g., see the far right edge of element 504 in fig. 20) closer to the first waveguide 200 than the first edge (fig. 20), the microresonator 100 being aligned by the first edge of the slot and the first waveguide (inherent to the device of fig. 20). Thus claim 7 is met.

Vahala et al. teaches wherein the slot has a first edge and a second edge closer to the first waveguide (e.g., element 200) than the first edge, the microresonator being aligned by the first edge of the slot and the second edge of the slot (inherent to the device of fig. 20). Thus claim 8 is met.

Vahala et al. teaches wherein the slot has a first edge and a second edge closer to the first waveguide than the first edge, the microresonator being aligned by the first edge of the slot and the second edge of the slot (inherent to the device of fig. 20; see also figs. 19, 21 as an aid to help understand this detail inherent to the device of fig. 20). Thus claim 9 is met.

Vahala et al. teaches wherein a direction of optical coupling between the first waveguide 600 and the microresonator 100 is parallel to the surface of the first substrate (inherent to the device of fig. 20). Thus claim 10 is met.

Vahala et al. teaches wherein a direction of optical coupling between the first waveguide and the microresonator is perpendicular to the surface of the first substrate (inherent to the device of fig. 20). Thus claim 11 is met.

Vahala et al. teaches wherein the first waveguide (e.g., 600) is an optical fiber (inherent to the device of fig. 20). Thus claim 12 is met.

Vahala et al. teaches wherein the optical fiber 600 is a tapered optical fiber (inherent to the device of fig. 20). Thus claim 13 is met.

Vahala et al. teaches wherein wherein the microresonator is microsphere (fig. 20; paragraphs 0090, 0153). Thus claim 16 is met.

Vahala et al. teaches further comprising an adhesive material disposed to hold the microresonator to the self-aligning feature (e.g., fig. 20; paragraph 0137). Thus claim 17 is met.

Vahala et al. teaches further comprising at least one retaining member disposed to retain the microresonator at a desired location relative to the self-aligning feature (e.g., fig. 20; paragraph 0137). Thus claim 18 is met.

Vahala et al. teaches further comprising a second substrate and a second waveguide disposed relative to the second substrate, the second waveguide being optically coupled to the microresonator (e.g., fig. 19; paragraph 0145). Thus claim 19 is met.

Vahala et al. teaches further comprising a light source generating light, the light being coupled to the first waveguide and from the first waveguide to the microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 20 is met.

Vahala et al. teaches further comprising a second waveguide disposed relative to the first substrate, the second waveguide being optically coupled to the first microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 24 is met.

Vahala et al. teaches further comprising a second substrate disposed proximate the first substrate (e.g., figs. 19-21; paragraph 0150). Thus claim 25 is met.

Vahala et al. teaches further comprising a second waveguide disposed relative to one of the first and second substrates, the second waveguide being optically coupled to the first microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 26 is met.

Vahala et al. teaches wherein the first waveguide is attached to the first substrate and the second waveguide is attached to the second substrate (e.g., figs. 19-21; paragraph 0150). Thus claim 27 is met.

Method claims 28-38 are rendered obvious by the reasons/references given above and/or conventionally known principles in the art. If Applicant disagrees with this obviousness holding for method claims 28-38, then Applicant should submit evidence showing this obviousness holding is errant. Examiner will then reconsider restricting.

Thus claims 28-38 are rejected.

Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vahala et al. (20020044739) and further in view of Frick (6901101).

Vahala et al. teaches further comprising a light source generating light, the light being coupled to the first waveguide and from the first waveguide to the microresonator (e.g., figs. 19-21; paragraph 0150). Thus claim 20 is met.

Regarding claims 21-22, although Vahala et al. does not explicitly teach a light detector it would have been obvious to do so because Vahala et al. does teach an optical filter (e.g., fig. 19; paragraph 0150) and also teaches that Vahala et al.'s microresonator devices are sensitive to temperature parameters (Vahala et al. fig. 19; paragraph 0150; paragraph 0118). Furthermore, Vahala et al.'s figure 19 microresonator filter configuration is virtually identical to a detector/filter configuration taught at Frick figure 8 (see also Frick col. 11 lines 34-55).

Vahala et al. and Frick are combined by taking the technology of Vahala et al. which teaches a filter composed of a microresonator between two waveguides on a self-aligning substrate and applying it to the filter/detector-composed-of-a-microresonator-between-two-waveguides technology of Frick to obtain the instant invention of a filter/detector-composed-of-a-microresonator-between-two-waveguides on a self-aligning substrate. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make such a combination for the purpose of providing a microresonator-detector device on a self-aligning substrate.

One of ordinary skill would have been motivated to make a detector using Vahala et al.'s microresonator-filter configuration so that one could provide Vahala et al.'s self-aligning capacity and provide the additional capability of, e.g., temperature detection.

Thus claims 21-22 are rejected.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Mooney whose telephone number is 571-272-2422. The examiner can normally be reached during weekdays, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael P. Mooney
Examiner
Art Unit 2883

Frank G. Font
Supervisory Patent Examiner
Art Unit 2883

FGF/mpm
5/23/07